

Choosing Sample Size

- Formula for the confidence interval:

$$\hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

- Changing the sample size affects what part of the confidence interval?

m.o.e.

- If we increase the sample size...

↓ m.o.e.

- We can choose sample size...

to get a specific
m.o.e.

- How? What part is the margin of error?

$$m = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

- Plug in...

- m
- conf level (z^*)
- \hat{p}

****PROBLEM:** how do we know \hat{p} before sample?

****ANSWER:** use a guessed/known value for \hat{p}

- But what if we aren't given a value/guess for p^* ?

conservative estimate for $\hat{p} = 0.50$

- You can also rearrange to solve for n :

* $n =$

1) An EPA investigator wants to know the proportion of fish that are inedible because of chemical pollution downstream of an offending factory. If the answer must be within ± 0.03 at the ~~90%~~ ^{95%} confidence level, how many fish should be in the sample tested?

$$m = 0.03 = z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$0.03 = 1.96 \sqrt{\frac{(0.5)(0.5)}{n}}$$

$$n = 1067.11 \rightarrow 1068$$

\downarrow \downarrow

$m = 0.03$ $m < 0.03$

always
* round up!

Complete the worksheet on the next page-
8.1- Choosing Sample Size